

**INTERNATIONAL CIVIL AVIATION ORGANIZATION
ASIA AND PACIFIC OFFICE**



**REPORT OF THE SPECIAL CO-ORDINATION MEETING
OF THE ICAO REDUCED VERTICAL SEPARATION MINIMUM
IMPLEMENTATION TASK FORCE
FOR THE WESTERN PACIFIC/ SOUTH CHINA SEA IMPLEMENTATION
(RVSM/SCM)**

MANILA, PHILIPPINES

29 - 31 JULY 2002

The views expressed in this Report should be taken as those of the
Task Force and not the Organization

Published by the ICAO Asia and Pacific Office, Bangkok

RVSM/SCM
Table of Contents

	Page
History of the Meeting	
Introduction	i
Attendance.....	i
Officers and Secretariat	i
Opening of the Meeting.....	i
Documentation and Working Language.....	ii
 Summary Report of the Meeting	
Agenda Item 1: Adoption of Agenda	1
Agenda Item 2: Operational Considerations	1
Agenda Item 3: Issues Relating to Airworthiness and Approval of Aircraft	4
Agenda Item 4: Safety and Airspace Monitoring Considerations	5
Agenda Item 5: Implementation Management Considerations	7
Agenda Item 6: Review of Action Items	7
Agenda Item 7: Future Work – Meeting Schedule.....	8
Agenda Item 8: Other Business	8
 Appendices	
Appendix A: Terms of Reference of the ICAO RVSM Implementation TF	A-1
Appendix B: Terms of Reference of the ICAO RVSM TF Work Groups.....	B-1
Appendix C: List of Participants.....	C-1
Appendix D: List of Papers	D-1
Appendix E: Agenda.....	E-1
Appendix F: Operational Implementation Plan Table (Western Pacific/South China Sea)	F-1
Appendix G: List of AIC/AIP Supplements Issued by States	G-1
Appendix H: Criteria for Calculation of Duration of Large Height Deviation	H-1
Appendix I: Task List for Western Pacific/South China Sea Area	I-1

.....

1.1 Introduction

1.1.1 The Special Co-ordination Meeting of the ICAO Reduced Vertical Separation Minimum (RVSM) Implementation Task Force for the Western Pacific/South China Sea Implementation (RVSM/SCM) was hosted by the Air Transportation Office (ATO), Department of Transportation and Communication of the Philippines and held in Manila, Philippines from 29 to 31 July 2002.

1.1.2 The Terms of Reference for the Task Force are contained in Appendix A to this Report.

1.2 Attendance

1.2.1 The meeting was attended by 59 participants from Australia, Cambodia, Hong Kong China, Indonesia, Lao PDR, Malaysia, Philippines, Saudi Arabia, Singapore, Thailand, the United States, Viet Nam, IATA, IFALPA and IFATCA. A complete list of participants is at Appendix C.

1.3 Officers and Secretariat

1.3.1 Mr. Sydney Maniam, Senior Air Traffic Control Manager (Standards), Civil Aviation Authority of Singapore (CAAS), Singapore, continued as Chairman of the Task Force. Mr. Hiroshi Inoguchi, Regional Officer, Air Traffic Management (ATM) from the ICAO Asia and Pacific Office, Bangkok served as the Secretary for the meeting.

1.3.2 Mr. Yusfandri Gona, Head of Performance & Flight Test Section, Directorate General Air Communication (DGAC) Indonesia and Mr. Greg Hood, FIR Manager, Airservices Australia, continued as Chairman of the Aircraft Operations & Airworthiness Work Group (OPS/AIR/WG) and of the ATC Operations Work Group (ATC/WG), respectively. Mr. Nopadol Sangngurn, Vice-President, Business Development Bureau, AEROTHAI, chaired the Safety & Airspace Monitoring Work Group (SAM/WG), with the assistance of Mr. Bob Miller.

1.4 Opening of the Meeting

1.4.1 Major General Adelberto F. Yap, Director General of ATO and Assistant Secretary, officially opened the meeting and welcomed all participants. He referred to his recent attendance at a seminar held in Washington D.C., United States, in relation to aviation security, and emphasized the need of aviation authorities to closely work to enhance safety of civil aviation. In this connection, Mr. Yap mentioned that States in Southeast Asia have been building cooperative relations among themselves and tightening it through various forums and meetings. The government of the Philippines and ATO have been engaged in many aviation related meetings in this year, and this RVSM/SCM was considered as an example of Philippines' active involvement in developing a safe and efficient air transport system in the region.

1.4.2 Mr. Sydney Maniam outlined the work that had to be completed in order to meet the target date of implementation on 31 October 2002 in the rest of the Western Pacific/South China Sea area. He stressed that the second phase of RVSM implementation should not result in major changes to the operational plan that had been developed for the area. In this context, the assignment of RVSM levels and the application of ATC procedures (including No-PDC and contingency procedures)

should be consistent with those currently being applied in the FIRs/AOR that had implemented RVSM in February 2002. He urged all concerned to continue to work closely to further improve the use of airspace and the management of traffic in the region, where a high increase of traffic demand has been forecast.

1.4.3 Mr. Hiroshi Inoguchi, on behalf of Mr. Lalit Shah, Regional Director of the ICAO Asia and Pacific Office, welcomed the participants. He emphasized the importance of roles States would play in the area of safety assessment of RVSM operations. He referred to the late submission of Working/Information Papers noted at the previous Task Force meetings, and mentioned with appreciation that there was a significant improvement as a result of cooperation by participants for this meeting.

1.5 **Documentation and Working Language**

1.5.1 The working language of the meeting as well as all documentation was in English.

1.5.2 Twelve Working Papers and eight Information Papers were presented to the meeting. A list of papers is included at Appendix D.

.....

Agenda Item 1: Adoption of Agenda

1.1 The meeting reviewed the provisional agenda presented by the Chairperson and adopted it as the agenda for the meeting. This agenda is at Appendix E to the Report.

Agenda Item 2: Operational Considerations

Operational Implementation Plan – 31 October 2002

2.1 States involved in the second phase of the implementation of RVSM in the Western Pacific/South China Sea area on 31 October 2002 reported their readiness as follows:

2.1.1 Cambodia reported that preparations for the implementation of RVSM were progressing satisfactorily to include R468 (PNH – SAPEN).

2.1.2 The meeting noted that China was not able to attend the meeting for administrative reasons. However, it was advised that China would hold bi-lateral meetings with Hong Kong China and Viet Nam in July and August 2002 respectively to discuss outstanding matters, including amendment to the existing LOAs/SLOAs.

2.1.3 Hong Kong China advised that preparations for the RVSM implementation in the Hong Kong FIR were progressing well. The band of RVSM levels would be from FL290 to FL410.

2.1.4 Indonesia advised that preparations for the implementation of RVSM in the Jakarta, Ujung Pandang and Bali FIRs were progressing well. The RVSM training program for controllers was finalized in March 2002. Given the length of time that would have elapsed between training and implementation, refresher training would be conducted for controllers prior to implementation in October 2002.

2.1.5 Lao PDR advised that preparations for the RVSM implementation were progressing well.

2.1.6 Malaysia, Philippines and Singapore reported that under the second phase implementation, the band of RVSM levels in their respective FIRs would be extended from FL290 to FL410.

2.1.7 Thailand advised that under the second phase implementation, RVSM would be implemented on three major international routes (A1, A202 and R474) and some domestic routes in the Bangkok FIR, applying a single alternate FLOS.

2.1.8 Viet Nam advised that preparations for the implementation of RVSM on the remaining routes in the Ho Chi Minh FIR and specific routes in the Han Noi FIR were progressing well. RVSM would be implemented from FL290 to FL410.

2.2 The meeting agreed that where necessary States should establish transition areas and procedures to facilitate the transit of aircraft between the FIRs/AOR concerned.

2.2.1 Indonesia agreed to the establishment of a transition area in the Ujung Pandang FIR for aircraft that are northwest bound as follows:

- A461 - Aircraft will transition to FL350 or FL390 between BONDA and the Manila FIR boundary.

- R590 - Aircraft will transition to FL350 or FL390 between DULON and the Manila FIR boundary.
- B472 - Aircraft will transition to FL350 or FL390 between TEMON and the Manila FIR boundary.
- B473 - Aircraft will transition to FL350 or FL390 between SAMGE and the Manila FIR boundary.
- B462 - Aircraft will transition to FL350 or FL390 between MIMIK and the Manila FIR boundary.

2.3 The meeting finalized the operational plan for the implementation of RVSM in the Western Pacific/South China Sea area as shown in Table 2.1 of Appendix F to the Report.

Assignment of RVSM Levels

2.4 The meeting recalled that RVSM/TF/14 had agreed that the assignment of levels to aircraft operating on the 6 parallel RNAV routes and crossing routes in the South China Sea (referred to as the Modified Single Alternate Level Assignment Scheme) would continue to be applied. The meeting re-affirmed that this level assignment would be applied, with priority for levels being accorded to aircraft on the parallel routes.

2.5 The meeting agreed to the use of FL300 and FL400 as No-PDC levels. The meeting also agreed that the changes would be incorporated in the respective AIP Supplement or AIP Amendment that would be published by States concerned.

2.6 Due to operational considerations, Hong Kong, China will adopt the modified single alternate FLOS in the airspace where RVSM will be implemented. Based on simulation studies, it has been concluded that Hong Kong, China would not be able to provide extra capacity to facilitate the transition of aircraft between the modified single alternate and single alternate FLOS. Pertinent considerations include impact due to non-RVSM operations to the east of Hong Kong and Taipei FIRs, separation between traffic over flying the Hong Kong FIR and those inbound to and outbound from Hong Kong, and operational complexity within the Hong Kong airspace in which transition would be required.

2.7 In view of the differences relating to the assignment of levels on ATS route A1 in the relevant FIRs, Thailand offered to:

- a) evaluate the impact of the FLOS level changes from the modified single alternate to the single alternate on A1 between the reporting points PAPRA and BUTRA in the Vientiane FIR; and
- b) analyze the impact on ATC operations as a result of the transition.

2.7.1 The meeting noted that Thailand would provide a report on the assessment relating to the transition at RVSM/TF/16, where a Go/No-Go decision for the second phase implementation in Bangkok FIR would be made.

2.8 Hong Kong, China and Thailand agreed to co-ordinate with States concerned to address the issues relating to the FLOS for aircraft operating on A1 and P901. The meeting noted that Hong Kong, China and Thailand would provide at RVSM/TF/16 a report on the outcome of the co-ordination.

Publication of AIC/AIP Supplement

2.9 The meeting noted that only one State involved in the second phase of RVSM implementation had published the AIP Supplement on RVSM operations in July 2002. The other States would publish the AIP Supplement **in early August 2002**. In addition, States that had implemented RVSM in February 2002 had published the AIP Amendment to inform operators of the changes relating to the application of RVSM from FL290 to FL410, the corresponding assignment of levels based on No-PDC procedures and the Section 12.0 of the AIP Supplement relating to the approval of non-RVSM compliant aircraft in RVSM airspace as amended at RVSM/TF/14. A table showing the latest status of publication of the AIC and AIP Supplement is at Appendix G to this Report.

Reports on Large Height Deviations

2.10 The meeting reviewed the reports on large height deviations due to operational errors that had been submitted to the APARMO. The meeting noted that there were some variations in the determination of the duration of flight when the aircraft was at the incorrect flight level. The meeting developed the criteria to be used by ATS providers for the calculation of the duration of flight at the incorrect level, as shown in Appendix H. The criteria would be used with immediate effect. In addition, States that had submitted reports on large height deviations for the period November 2001 to June 2002 would provide the APARMO with updated reports (not later than 31 August 2002). The APARMO would subsequently re-evaluate the safety assessments to ascertain whether the target level of safety (TLS) could be met for the second phase of RVSM implementation on 31 October 2002. The APARMO would provide a report at the Task Force/16 Meeting in September 2002.

2.11 The meeting was advised that the majority of States concerned had submitted reports on large height deviation, including “NIL” reports, to the APARMO over the last 12 months (up to June 2002). However, the meeting noted that a few States had not provided the essential information. ICAO would continue to liaise with the States concerned, in order for the APARMO to complete the safety assessments for RVSM implementation.

Large-Scale Weather Deviations

2.12 The meeting considered the issue of large-scale weather deviations and adopted the following guideline:

A large-scale weather contingency should be considered when there are at least 5 weather deviation requests of 10NM or more within a 30 minute period.

2.13 The meeting accepted the following as a basis to progress further work on contingency plans for large-scale weather deviations:

Routes	No-PDC Level Assignment
L642 and N892	FL320, FL360 and FL400
L625 and M771	FL300, FL340 and FL380

Letters of Agreement (LOAs)/Supplementary LOAs (SLOAs)

2.14 The meeting reviewed the draft LOAs/SLOAs that were necessary to facilitate the second phase implementation on 31 October 2002. The meeting agreed that the LOAs/SLOAs would be signed by the States concerned at or prior to RVSM/TF/16 when mutually agreed.

Agenda Item 3: Issues Relating to Airworthiness and Operation of Aircraft**Assessment of Operator Readiness**

3.1 The OPS/AIR Work Group consisted of 6 airlines (viz Thai Airways, Air Macau, China Southern, Philippines Airlines, Air Philippines and Cebu Pacific Air) and 3 States (viz Indonesia, Malaysia and Philippines) and IATA.

3.2 The meeting reviewed the readiness of operators on international routes in the Western Pacific/South China Sea area and noted that more than 90% of operators were RVSM-approved. The following aircraft had not obtained RVSM approval:

- a) Forty B737-200 that were operated by 12 domestic airlines of Indonesia;
- b) Six B737-200, including B727, that were operated by airlines of Malaysia;
and
- c) Eight B737-200 and two B757 that were operated by airlines of the Philippines

Monitoring Programme for Height-Keeping Performance

3.3 The meeting reviewed the monitoring programme for the height-keeping performance of aircraft and noted the following:

- a) Indonesia, Malaysia, Philippines, and IATA reported that there were no reports from operators on large height deviation due to the aircraft system failure or pilot error since the implementation of RVSM in February 2002. Thai Airways, Air Macau, China Southern, Philippines Airlines, Air Philippines also reported that there were no reports of large height deviation due to aircraft system problem or pilot error.
- b) The meeting noted that during the period of May to July 2002 there had been several cases of adverse weather in the Western Pacific/South China Sea area, such as thunderstorm and severe turbulence. There were no reports of adverse typhoon effects on RVSM operations in the area.

3.4 The meeting requested the APARMO to report large height deviations caused by airworthiness system or pilot error to the States concerned, in order to improve safety levels.

3.5 The meeting agreed to review the APARMO Form F3 relating to the “Withdrawal Approval of Aircraft to Operate in Pacific RVSM Airspace.” This review will be conducted at the next RVSM/TF/16.

Agenda Item 4: Safety and Airspace Monitoring Considerations

Review of Safety Assessment for the Implementation of RVSM in Western Pacific/South China Sea

4.1 The meeting reviewed the presentation given by the APARMO on the large height deviation reports. As discussed in WP/8 presented at RVSM TF/14 Meeting, the estimate of risk attributable to operational errors exceeded the agreed TLS associated with the planned implementation of RVSM in October 2002. The analysis followed the standard procedures for risk estimation in conjunction with a decision to implement RVSM, in particular, the analysis used for large height deviations over the preceding twelve months.

4.2 Among the parameters, the collision risk model used in the safety assessment for RVSM requires:

- a) Estimated annual flying hours in target airspace;
- b) Vertical occupancy values (opposite and same direction occupancy at adjacent flight levels), a measure of traffic packing in the airspace;
- c) Reports of large height deviations containing the cause, location, and duration of each flight level deviation of 300 ft or more.

4.3 Reports of large height deviations used in assessment were as reported to the APARMO during for period May 2001 to April 2002, *i.e.* the latest twelve months, in keeping with the standard procedures for risk estimation used in other airspaces. This traffic sample reflects traffic patterns in the South China Sea airspace with the revised ATS route structure in place in November 2001, prior to RVSM implementation.

4.4 Given the desire to implement the RVSM in the remaining FIRs/AOR of the Western Pacific/South China Sea area in October 2002 and the current large height deviation information, a safety assessment would produce a risk in excess of the TLS. It was necessary to modify the standard procedures for risk estimation, in conjunction with the decision to implement RVSM, in order to reflect the possible benefits of intervention.

4.5 The meeting developed the proposed methodology to examine reports of large height deviations. The meeting considered that it was necessary to review the reports received from May 2002, *i.e.* the month when intervention was applied to remove the underlying causes of such deviations, through September 2002. If intervention was effective and the APARMO could determine statistically that a lower rate pertained for June to September 2002 and if this rate was low enough, there would be a basis for RVSM implementation in October 2002. An upper 95 percent confidence limit would be used to determine if the rates are different.

4.6 In the event the proposed modification of the risk estimation methodology is less than the TLS value, the implementation of RVSM would be justified. Therefore, the following tasks had to be completed before RVSM/TF/16 Meeting:

- a) Review the duration contained in the large height deviation reports to determine if the typical duration was of the length reported;
- b) Review the application of the collision risk model for operational risk in regard to the usage of opposite-direction routes in the Western Pacific/South China Sea airspace;
- c) Use the proposed methodology to estimate the overall risk, and compare to the TLS value;

- d) The Task Force would judge whether the planned October 2002 implementation was justified based on the overall risk estimate.

4.7 The meeting formed a scrutiny group of operational experts to review the large height deviations over the Western Pacific/South China Sea area. This group comprised representatives from the APARMO, IATA and the ATS providers concerned. The problem identified was the variations in time measurements. The measurement was an inherent parameter in the Collision Risk Model for the Vertical Dimension. In most cases, it was found that the time of the operational error reported to the APARMO was greater than the actual time of flight at the incorrect flight level.

4.8 The group proposed the criteria to be used for evaluating the operational error, specifically the determination of the duration of flight at the incorrect flight level. The meeting adopted the criteria as follows:

- a) No Breakdown in Separation
 - i) Between the time over the boundary and the time when the error was discovered; where the operational error involved more than one FIR/AOR; or
 - ii) The total time aircraft was at the level not known by ATC; where the operational error occurred involving a single FIR/AOR.
- b) Breakdown in Separation
 - i) Between the time when separation was infringed and the time when a minimum separation was established.

This criteria is shown at Appendix H to the Report.

4.9 The meeting decided that States would review the large height deviation reported since November 2001 and re-calculate the time of operational error. These updated reports should be submitted to the APARMO as soon as possible or, but not later than 31 August 2002. All new large height deviation reports (starting from July 2002) would be based on the criteria described above. The reports should be sent via email (most preferable), fax, or post.

4.10 The APARMO was concerned about the number of large height deviations in the Western Pacific/South China Sea area and requested to be informed of the remedial actions taken to avoid the recurrence of ATC operational errors. States would notify the APARMO of the procedures or actions put in place to enhance the ATC coordination, for example, special phraseology to indicate the urgency of the message in the communication.

4.11 The meeting reviewed IP/8, which described the procedures to submit large height deviation reports to the APARMO. The meeting noted the new email contact address of the APARMO as **9-act-parmo@faa.gov**. In addition, the APARMO would send a confirmation to the sender of each large height deviation report indicating that the report was successfully received.

Progress of AEROTHAI's Preparation

4.12 At RVSM TF/14 and 15 Meetings held in Bangkok (30 – 31 May and 3 – 7 June 2002 respectively), the Task Force was informed of the progress of transferring the responsibility for RVSM monitoring in Asia, between the FAA Technical Center and AEROTHAI. The RVSM Task Force was also informed of the cooperation between the FAA Technical Center and AEROTHAI in the area of airspace analysis and data collection process pertaining to RVSM monitoring services, as well the arrangements for the training for personnel from the AEROTHAI at the FAA Technical

Center. A Memorandum of Understanding (MOU) has been drafted and awaiting an approval from the legal office of the FAA. The progress of signing the MOU between the FAA and AEROTHAI was under way.

4.13 The training of the airspace analysis and data collection process pertaining to RVSM monitoring services was expected to be completed by the end of September 2002. Meanwhile, AEROTHAI was preparing the infrastructure of the monitoring agency for the RVSM implementation, which includes:

- a) Arranging a working area for the monitoring operations;
- b) Installing the equipment required for airspace analysis and data collection process pertaining to the RVSM implementation;
- c) Conducting the website of the monitoring agency for the RVSM operations in the Asia Region;
- d) Determining the cost of the monitoring services.

4.14 The infrastructure of the monitoring agency for the RVSM implementation was expected to be in place and ready to use by the time that the training with FAA was completed. AEROTHAI would provide the details of their transition plan at the next RVSM/TF/16. As for the transitional period after October 2002, the FA Technical Center has offered to continue to support the monitoring functions until the AEROTHAI's RVSM monitoring infrastructure was assured.

Agenda Item 5: Implementation Management Considerations

Task Force Work Groups

5.1 The meeting continued with the decision that in order to accomplish the tasks in the action plan, the Task Force should be divided into smaller Work Groups as follows:

- a) Safety & Airspace Monitoring;
- b) ATC Operations; and
- c) Aircraft Operations & Airworthiness

5.2 The Terms of Reference of the Work Groups were reviewed as at Appendix B to the Report. The discussions from the Work Groups are contained under Agenda Items 2, 3 and 4.

Review of the Preparations for RVSM Implementation

5.3 Updates on the implementation of RVSM on 21 February 2002 were provided by Cambodia, Malaysia, Philippines, Singapore, Thailand and Viet Nam. Reviews on the readiness to implement RVSM on 31 October 2002 were also provided by Hong Kong China, Indonesia, Lao PDR and Viet Nam. These reports were further taken into account during the work of the ATC/WG.

Agenda Item 6: Review of Action Items

6.1 The meeting reviewed and updated the task list relating to the implementation of RVSM as shown at Appendix I to the Report.

Agenda Item 7: Future Work – Meeting Schedule

7.1 The meeting agreed on the future work of the Task Force as follows:

RVSM/TF/16: 23-25 September 2002 in Bangkok, Thailand
(Western Pacific/South China Sea Focus)

Joint Interface Meeting between Asia/Pacific and Middle East RVSM Task Forces:
19-20 October 2002 in Abu Dhabi, UAE

(Target Implementation in Bali, Hanoi, Hong Kong, Jakarta, Ujung Pandang and Vientiane FIRs and Sanya AOR AIRAC date 31 October 2002)

RVSM Seminar/5: 6-8 November 2002 (tentative) and location TBD
(Bay of Bengal and Beyond Focus)

RVSM/TF/17: 11-15 November 2002 (tentative) location TBD
(Bay of Bengal and Beyond Focus)

RVSM/TF/18: 3 days February 2003 location TBD
(90-day and 1-year follow up review on Western Pacific/South China Sea Focus)

RVSM/TF/19: 5 days May 2003 location TBD
(Bay of Bengal and Beyond Focus)

RVSM/TF/20: 5 days October 2003 location TBD
(Bay of Bengal and Beyond Focus)

(Target Implementation Bay of Bengal Area and Beyond AIRAC date 27 November 2003)

RVSM/TF/21: 3 days February 2004 location TBD
(90-day follow up review on Bay of Bengal and Beyond Focus)

RVSM/TF/22: 2 days November 2004 location TBD
(1-year follow up review on Bay of Bengal and Beyond Focus)

Agenda Item 8: Other Business

8.1 The meeting expressed its appreciation to the participants for the timely submission of Working/Information Papers which had facilitated the preparation of meeting documents. The meeting urged the participants to continue to forward their Working/Information Papers to the Secretariat in an electronic form no later than 10 days prior to any future meetings of the Task Force.

8.2 There was no other business identified.

9. **Closing of the Meeting**

9.1 Mr. Sydney Maniam, the Chairman of the Task Force, on behalf of the participants, expressed sincere appreciation to the ATO, Philippines, for the excellent and professional conduct of the meeting. He commended and thanked all staff of the organizer for the warm hospitality and assistance provided during the meeting, that contributed in no small way to the successful completion of the meeting.

.....